UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,607	04/27/2006	W. Charles O'Neill	050508-1400	5401

24504 7590 10/01/2010

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
600 GALLERIA PARKWAY, S.E.
STE 1500
ATLANTA, GA 30339-5994

EXAMINER	
KASSA, TIGABU	

ART UNIT	PAPER NUMBER
1619	

MAIL DATE	DELIVERY MODE
10/01/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,607	O'NEILL ET AL.	
	Examiner	Art Unit	
	TIGABU KASSA	1619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 9-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 9-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Formal Matters

Applicant's amendment filed on 07/09/2010 is acknowledged and entered. **Claim 1-5 and 9-13 are pending and are under consideration in the instant office action.** Claims 6-8 and 14-34 are cancelled. Applicant has amended instant claim 1.

Rejections Withdrawn

Applicant's amendments and arguments filed on 07/09/09 are acknowledged and have been fully considered. The rejections applied in the previous office action under 35 U.S.C. 112, first and second paragraphs are withdrawn as per applicant's claim amendments and cancellation of claims 14-16.

Note: Applicant's arguments regarding the rejections set forth in the previous office action under 35 U.S.C. 103(a) specifically about the prior art reference Lomashvili et al., (J Am Soc Nephrol 2005, 16, 2495-2500; IDS reference) is persuasive. Therefore, Lomashvili et al., is removed from the rejection. However, the rejection under 35 U.S.C. 103(a) based on the combination teachings of the remaining references of record is maintained and articulated as set forth below.

Rejections Maintained

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, and 11-13 remain rejected under 35 U.S.C. 102(b) as being anticipated by Gupta et al. (Kidney International 1999, 55, 1891-1898), for the reasons of record and the reasons set forth herein.

Response to arguments

Applicant's arguments filed on 07/09/2010 have been fully considered but they are not persuasive.

Applicant argues that claim 1 has been amended to recite the additional step of "inhibiting vascular calcification in the human with the effective amount of pyrophosphate-type compound." The step is not taught or suggested by Gupta. Instead, Gupta employs ferric pyrophosphate in dialysate because "[h]emodialysis patients need iron to replenish ongoing losses" and "[p]yrophosphate strongly complexes iron and enhances iron transport."

This is not found persuasive because inhibiting vascular calcification inherently occurs upon administration of the pyrophosphate compound. The required step in the claim recitation is administration of the pyrophosphate compound which is clearly meet by the prior art in the same patient population. It is noted that there is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure at the time of invention, but only that the subject matter is in fact inherent in the prior art reference. *Schering Corp. v. Geneva Pharm. Inc.*, 339 F.3d 1373, 1377, 67 USPQ2d 1664, 1668 (Fed. Cir. 2003) (rejecting the contention that inherent anticipation requires recognition by a person of ordinary skill in the art before the critical date and allowing

expert testimony with respect to post-critical date clinical trials to show inherency); see also *Toro Co. v. Deere & Co.*, 355 F.3d 1313, 1320, 69 USPQ2d 1584, 1590 (Fed. Cir. 2004)("[T]he fact that a characteristic is a necessary feature or result of a prior-art embodiment (that is itself sufficiently described and enabled) is enough for inherent anticipation, even if that fact was unknown at the time of the prior invention."); *Abbott Labs v. Geneva Pharms.*, Inc., 182 F.3d 1315, 1319, 51 USPQ2d 1307, 1310 (Fed.Cir.1999) ("If a product that is offered for sale inherently possesses each of the limitations of the claims, then the invention is on sale, whether or not the parties to the transaction recognize that the product possesses the claimed characteristics."); *Atlas Powder Co. v. Ireco, Inc.,* 190 F.3d 1342, 1348-49 (Fed. Cir. 1999) ("Because sufficient aeration' was inherent in the prior art, it is irrelevant that the prior art did not recognize the key aspect of [the] invention.... An inherent structure, composition, or function is not necessarily known."); *SmithKline Beecham Corp. v. Apotex Corp.*, 403 F.3d 1331, 1343-44, 74 USPQ2d 1398, 1406-07 (Fed. Cir. 2005) (holding that a prior art patent to an anhydrous form of a compound "inherently" anticipated the claimed hemihydrate form of the compound because practicing the process in the prior art to manufacture the anhydrous compound "inherently results in at least trace amounts of" the claimed hemihydrate even if the prior art did not discuss or recognize the hemihydrate).

Additionally, "the discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). Thus, the claiming of a new use, new function or unknown property which is inherently present in the prior art

does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). In *In re Crish*, 393 F.3d 1253, 1258, 73 USPQ2d 1364, 1368 (Fed. Cir. 2004), the court held that the claimed promoter sequence obtained by sequencing a prior art plasmid that was not previously sequenced was anticipated by the prior art plasmid which necessarily possessed the same DNA sequence as the claimed oligonucleotides. The court stated that "just as the discovery of properties of a known material does not make it novel, the identification and characterization of a prior art material also does not make it novel." Id. See also MPEP § 2112.01 with regard to inherency and product-by-process claims and MPEP § 2141.02 with regard to inherency and rejections under 35 U.S.C. 103.

Applicant also argues that in claim 13, the claim leaves out a range that would incorporate 1.6 μM. Thus, through the doctrine of claim differentiation, Applicants do not admit that 1.6 μM of claim 13 is about 3 μM.

This is not found persuasive because the use of the term "about" is not defined in the specification what ranges it would constitute. Therefore, the claimed range does not exclude a range that can incorporate 1.6 μM.

Applicant has not demonstrated how the claimed method is patentably distinct from the cited prior art nor do the claims as currently written distinguish the instant invention over the prior art. Therefore, instant claims 1, 5, and 11-13 lack novelty to one of ordinary skill in the art at the time the invention was made, as evidenced by the reference, especially in the absence of evidence to the contrary.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5, 9, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et al. (Kidney International 1999, 55, 1891-1898) and Russell et al. (The Journal of Clinical Investigation 1971, 50, 961-969).

Applicant claims

Applicant claims a method of providing vascular calcification therapy to a human in need of treatment comprising the steps administering to the human during dialysis a dialysate having an effective amount of a pyrophosphate-type compound, wherein the human has renal disease or failure and inhibiting vascular calcification in the human with the effective amount of pyrophosphate-type compound. The dependent claims thereof recite types of pyrophosphate compounds and concentrations of pyrophosphate type compound.

Determination of the Scope and Content of the Prior Art (MPEP §2141.01)

The teachings of Gupta et al., are set forth above.

Ascertainment of the Difference between Scope the Prior Art and the Claims (MPEP §2141.012)

Gupta et al., teach the addition of pyrophosphate to dialysis dialysate in a concentration of 1.6 μm. The limitation of claim 13 is in the alternative rendered obvious in combination with the teachings of Russell et al.,

Russell et al., teach the concentration of pyrophosphate in plasma in normal persons is 3.5 μmols/liter (3.5 μM) (see page 967 first column paragraph 2).

Finding of Prima Facie Obviousness Rationale and Motivation (MPEP §2142-2143)

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Gupta et al., by adding the pyrophosphate at a concentration of about 3 to about 5 μM and thus produce the instantly claimed invention since Russell et al. teach the normal level of pyrophosphate in plasma

is 3.5 μM. An ordinary skilled artisan would have been motivated to add the pyrophosphate to the dialysate at a concentration of about 3 to about 5 μM in order to optimize the level of pyrophosaphte in the blood of the dialysis patient. The examiner notes that since the pyrophosphate moves down its concentration gradient across the semipermiable membrane used in dialysis it would have been obvious to the skilled artisan to select the normal concentration of pyrophosphate in human blood plasma as the appropriate concentration of pyrophosphate to add to the dialysate. One of ordinary skill in the art at the time of the instant application was filed would have had a reasonable expectation of success in adding the pyrophosphate to the dialysate in such a concentration since Gupta et al., already teaches the addition of pyrophosphate to dialysate and the normal plasma levels of pyrophosphate are thought by Russell et al., Furthermore, with regard to the concentration limitation of instant claim 13 the examiner correlates from the teachings of Gupta et al., the concentration of iron to pyrophosphate considering ferric pyrophosphate has a formula of $Fe_4(P_2O_7)_3$. Based on the examiner's calculation, the maximum 12 μg/dl of iron in the solution correlates to 1.6 μM of pyrophosphate. The examiner takes the position that 1.6 μM is close enough to about 3 μM that it will impart similar effect. A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

In light of the forgoing discussion, one of ordinary skill in the art would have concluded that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a).

From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Claims 1-4 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et al., (Kidney International 1999, 55, 1891-1898), and Sommer (A text of inorganic chemistry, Herbert Hayward, 1906).

Applicant claims

Applicant claims a method of providing vascular calcification therapy to a human in need of treatment comprising the steps administering to the human during dialysis a dialysate having an effective amount of a pyrophosphate-type compound, wherein the human has renal disease or failure and inhibiting vascular calcification in the human with the effective amount of pyrophosphate-type compound. The dependent claims thereof recite types of pyrophosphate compounds and concentrations of pyrophosphate type compound.

Determination of the Scope and Content of the Prior Art

(MPEP 2141.01)

The teachings of Gupta et al., are set fort above.

Ascertainment of the Difference between Scope of the Prior Art and the Claims (MPEP 2141.02)

Gupta et al., do not specifically teach the pyrophosphate salts of sodium, potassium, calcium or phosphoric acid. This deficiency is cured by Hayward et al.,

Hayward et al., teach that iron pyrophosphate is insoluble in water and to make it soluble sodium pyrophosphate is mixed with ferric citrate so as to form ferric pyrophosphate that is solublized in sodium citrate (page 412).

Finding of Prima Facie Obviousness Rational and Motivation (MPEP 2142-2143)

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the present invention was made to modify the teachings of Gupta et al., by adding sodium pyrophosphate and thus produce the instantly claimed invention since Hayward et al., teach that iron pyrophosphate is insoluble in water and to make it soluble sodium pyrophosphate is mixed with ferric citrate so as to form ferric pyrophosphate that is solublized in sodium citrate (page 412). Furthermore, Gupta et al., also clearly suggest that ferric pyrophosphate complexed with sodium citrate is soluble in aqueous solution. One of ordinary skill in the art would have been motivated to add sodium pyrophosphate because sodium pyrophosphate is used to make the soluble form of ferric pyrophosphate in a citrate form. The skilled artisan would have had a reasonable expectation of success combining the teachings of Gupta et al., and Hayward et al., because Gupta et al., teach the soluble form of ferric pyrophosphate and Hayward et al., teach how to prepare the soluble form from sodium pyrophosphate.

In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a).

From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Conclusion

No claims are allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIGABU KASSA whose telephone number is (571)270-5867. The examiner can normally be reached on 9 am-5 pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne P. Eyler can be reached on 571-272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tigabu Kassa 9/27/10

/Cheric M. Woodward/
Primary Examiner, Art Unit 1647